

R E M A R K S

Claims 1-20 were rejected under 35 USC 112, first paragraph because the letter “e” was not defined. In applicants view, any artisan in the engineering arts knows that “e” stands for a constant having a specific value; to wit, 2.71828.... In applicants’ view there is no need to define this constant but, to expedite prosecution, the specification and claim 1 are amended to explicitly define the meaning of “e.” As amended, it is respectfully submitted that claims 1-20 overcome the 35 USC 112, first paragraph rejection.

Claim 2 was rejection under 35 USC 112, second paragraph because, according to the Examiner, “the phrase ‘on or more iterations’ renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.” Applicants respectfully traverse. First, it is assumed that the Examiner meant “one or more” rather than “on or more” because claim 2 has the phrase “one or more.” Second, the Examiner’s reason for the rejection is unclear because it suggests that claim 2 has some limitations following the phrase “one or more iterations” whereas, in fact, only a period follows the phrase “one or more iterations”.

Claims 7, 8, and 14 were rejected under 35 USC 112, second paragraph. In connection with claims 7 and 8, the Examiner simply states (without an explanation) that the phrase “carried out when said step of determining, carried...” is vague. Applicants respectfully traverse. It is not clear what the Examiner considers vague, and applicants do not consider this phrase vague. Still, claims 7 and 8 are amended to make them clearer and it is hoped that the Examiner finds that sufficient. If not, applicants respectfully request that the Examiner identify the nature of the vagueness (keeping in mind that breadth, per se, does not violate 35 USC 112).

As for claim 14, the rejection is unclear because the Examiner’s remarks merely assert: “Claim 13: Limitation is unclear.” In the first instance, it is not clear whether the Examiner is rejecting claim 13 or rejecting claim 14.

Looking at claim 13, it is noted that it depends on claim 12. Claim 13 adds to claim 12 in specifying that the accounting specified in claim 12 is based on the present knowledge of the states of events mentioned in claim 12. The notion of present knowledge of the state of the events relates to the concept that the states of the events

might be different from those believed to be. In other words, the present knowledge may be erroneous. Claim 13 specifies that the accounting is based on the present knowledge of the states, in contrast to the actual values of the states.

Claim 14 also depends on claim 12, and it specifies the particular simulated events in those other PEs that are including in the accounting.

Thus, it is believed that both claims 13 and 14 are clear. If the Examiner wishes to maintain the rejection, applicants respectfully request that the Examiner be more specific as to the nature of the problem that the Examiner sees.

Based on the above, applicants respectfully submit that the 35 USC 112, second paragraph rejections are overcome.

Claims 1-20 were rejected under 35 USC 101. Applicants respectfully traverse.

As stated in the UTPO's *Examination Guidelines for Computer-Related Inventions* (Section 2(c)),

If the 'acts' of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Thus, a process consisting solely of mathematical operations, *i.e.*, converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

Respectfully, the claim 1 method does not meet these criteria because it defines a process that does more than only manipulate abstract concepts and ideas. Specifically,

- (a) The first step of the method is a step of assigning events, which is not a manipulation of numbers;
- (b) The assigning is to a specific number (*i.e.*, N) different processing elements.  
Since the step of assigning is not a manipulation and is, therefore, not part of any following "mathematical algorithm," the limitation of assigning to N processing elements (in the plural, rather than to one element) results in no preemption of whatever "mathematical algorithm" might follow.
- (c) The assigning is of **events**, which necessarily are information modules, or objects, that are installed in the N different processing elements, and such modules, or objects, though are represented by signals, are not "representing any of the foregoing" *i.e.*, abstract concepts or ideas.

Therefore, it is respectfully submitted that, according to Section 2(c) of the Guidelines, claim 1 is outside the bounds of non-statutory subject matter and, therefore, is statutory.

Moreover, Section 2(b)(i) of the Guidelines describes “Safe Harbors,” and one of those safe harbors specifies that a process is statutory when it requires

measurements of physical objects or activities to be transformed outside the computer into computer data, where data comprises signals corresponding to physical object or activities external to the computer system, and where the process causes a physical transformation of the signals which are intangible representations of the physical objects or activities.

In applicants’ claim 1, the “activities” of the statutory process are events. As specified in the claim, those are events of a physical system outside the computer. The assigning of events to PE’s corresponds to the activities that are “transformed outside the computer into computer data, where [the] data comprises signals corresponding to physical object or activities external to the computer system.”

To the extent that there is data manipulation, it is simulation of assigned events and, therefore, it affirmatively corresponds to the language of the guidelines.

Thus, the process falls clearly within the recognized “Safe Harbors” and is statutory.

Moreover, independently of the above, applicants respectfully submit that claim 1 defines statutory subject matter because the simulation step is executed by N processing elements in parallel. This is a physical limitation that is wholly unrelated to whatever data manipulations are undertaken. Aside from the fact that “mathematical algorithm” that is impliedly contained in claim 1 cannot be infringed by carrying out simulations with paper and pencil, it is also true that the “mathematical algorithm” that is impliedly contained in claim 1 cannot be infringed in a single processing element. Further still, the “mathematical algorithm” that is impliedly contained in claim 1 is not infringed if the events are executed in other than **in parallel**. Therefore, claim 1 does not

wholly preempt any mathematical algorithm, and clearly defines statutory subject matter.

Since claim 1 defines statutory subject matter, it is respectfully submitted that claims 2-20, which depend on claim 1, also define statutory subject matter.

Claims 1-20 were rejected under 35 USC 102 a being anticipated by a 1993 paper Lubachevsky et al. No title of the paper is given, and the only description is that the paper allegedly teaches “a general model of synchronous relaxation for parallel simulation with applications to circuit-switched networks (abstract)”. Alas, in the “Notice of References Cited” the Examiner identifies two articles by Lubachevsky et al; one dated 1998, and one dated 1991. Neither seems to be one dealing with synchronous relaxation for parallel simulation.

However, a 1993 article by Eick et al is also cited, and Lubachevsky is a co-author of that article. Its title suggests that this is the reference meant to be cited by the Examiner, and the following assumes that to be the case.

Applicants respectfully traverse the rejection.

The cited reference teaches a method where a plurality of PEs are arranged to work in parallel. The tasks assigned to the PEs are the simulation of events in a predefined time slice.

In connection with claim 1, the Examiner cited page 289, lines 1-8 and 20-25, page 293, lines 7-14, and page 312 lines 1-7.

The first passage (page 289, lines 1-8) teaches that during each iteration a PE constructs the sequence of events of its subsystem during the interval  $(i-1)\Delta$  and  $i\Delta$ . There is no definitive language in this passage that dictates the nature of the interval.

The second passage (page 289, lines 20-25) teaches that the interval  $\Delta$  can be chosen to be “on the order of”  $M/\log M$ , where  $M$  is the number of PEs used.

The third passage (page 293, lines 7-14) teaches that the events within the  $i^{\text{th}}$  time step  $[(i-1)\Delta, i\Delta)$  are computed iteratively. This passage, therefore, clearly resolves the ambiguity of the first-cited passage, and comports with applicants’ understanding and intention of what *they* taught in the cited

reference, as mentioned above; that is, the tasks assigned to the PEs in the cited reference are the tasks encompassed within a time slice.

The fourth passage (page 312 lines 1-7) teaches “recall that in this algorithm, a PE partitions its events chronologically in blocks of at most  $B$  bonds per block, where  $B$  is a parameter.” This passage, *per se*, is unclear, but it becomes clear when considered together with the teachings at the beginning of section 3.4 of the article, and more specifically the last 14 lines of page 298. This passage teaches a variation of the time slice approach, where a combination of time and number of elements is employed. Specifically, an interval (step size  $\Delta$ ) is chosen, but at each iteration “at most  $B$ ” events belonging to the system are simulated. If during the time interval there are fewer than  $B$  events, the simulations proceed to completion with that smaller number of events being simulated, and at the end of each iteration all of the PE’s are at a common point in time. Only those PE’s that experience more than  $B$  events in the operating time interval end up at a different points in time.

In contradistinction, claim 1 specifies the tasks of the PEs in terms of number of events. By design, each iteration has the same number of events being handled by all of the PEs, and at the end of each iteration the PEs are, almost assuredly, at different points in time. Thus, the nature of a simulation process in accord with the teachings of the cited article is different from the nature of the simulation process in accord with claim 1, which a “simulation step where each processing element (PE) simulates assigned events in blocks that include  $M$  edge events.” Accordingly it is respectfully submitted that claim 1 is neither anticipated nor rendered obvious by the reference.

Additionally, claim 1 specifies the number of events in terms of  $M$  *edge* events; that is, whatever number of events needs to be accumulated in order to include  $M$  *edge events*. No such teaching is present in the cited reference, and the Examiner has not asserted that there is such teaching.

Additionally still, claim 1 specifies that the value of  $M$  is “*approximately*  $e \log_e N$ ,” where  $N$  is the number of PEs. In contradistinction, the cited reference teaches that the time interval  $\Delta$  that is “on the order of”  $M/\log M$ .”

First there is clearly no correspondence to a time interval selection and to a selection of a number of event. Second " $M/\log M$ " is not a teaching or even a suggestion of " $e \log_e N$ " Third, "approximately" is different from "on the order of." Admittedly, "on the order of" is a broader range, which means that if the cited reference were to specify events rather than time (which it does not), and if the cited reference were to specify "on the order of  $e \log_e N$ " (which it does not), applicants would still be able to assert that there is no anticipation precisely because "approximately  $e \log_e N$ " has a narrower scope. It is black letter law that a specification of a narrow range as being superior is not anticipated by a description of a broader range.

For the above reasons, applicants respectfully submit that claim 1 is neither anticipated nor rendered obvious by the Eick et al reference.

Since claim 1 is neither anticipated nor rendered obvious by the Eick et al reference, it follows that dependent claims 2-20 are also neither anticipated nor rendered obvious by the Eick et al reference.

In view of the above amendments and remarks, applicants respectfully submit that all of the Examiner's rejections have been overcome.

Reconsideration and allowance are respectfully solicited.

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